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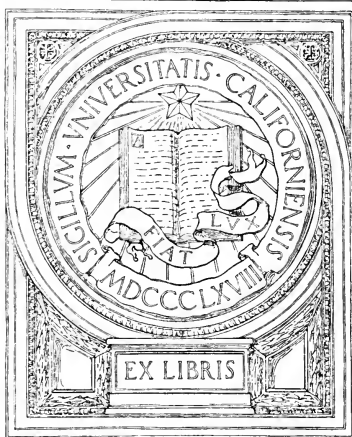
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Alessandro Irrigation District

By

William H. Hall

UNIVERSITY OF CALIFORNIA
AT LOS ANGELES



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ROBERT ERNEST COWAN

ALESSANDRO IRRIGATION DISTRICT, California :



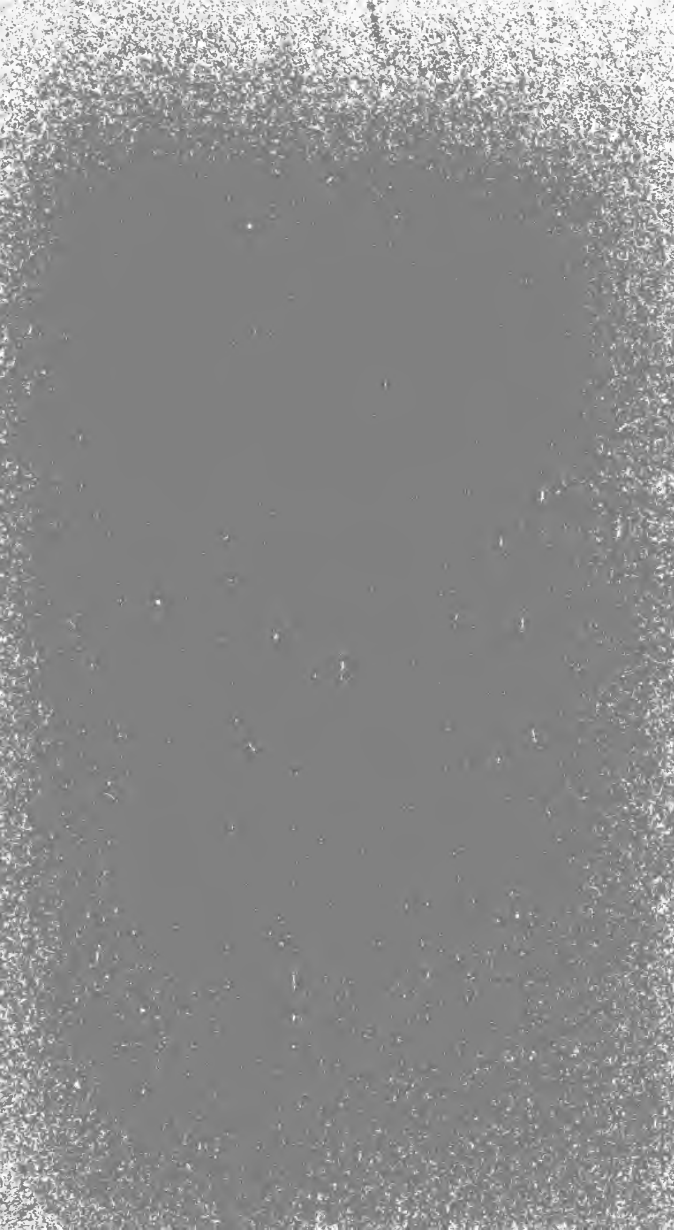
**Its Physical, Engineering and
Business Problems and Conditions,**
WM. HAM. HALL.

Its Legal Status,
WILSON & WILSON.



BACON & COMPANY,
Printers.

SAN FRANCISCO
October, 1891.



ALESSANDRO
IRRIGATION DISTRICT,
California :



**Its Physical, Engineering and
Business Problems *and* Conditions,**
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ABSORPTION OF
YACHTS FOR SALE

INTRODUCTION.

With the multiplication of Irrigation Districts in California, all equally authorized by law to issue and sell bonds, came the necessity at financial centers for definite and authentic information, well arranged and presented, concerning each. The bankers of San Francisco, to whose judgment and opinion constant appeal was being made by contemplating bond purchasers and financial agents abroad, and who were daily being applied to for information about these districts and their securities, could not take the time, or incur the expense for, or assume the entire responsibility of, the examinations needed to get at the facts on which to base their judgments, or from which to enlighten their correspondents.

This condition of affairs was proving a serious drawback to placing the district securities. It had to be remedied. A number of representative Irrigationists came to San Francisco, and the subjoined correspondence was the practical result of many meetings and interviews with representative bankers.

The engineer's reports and the attorneys' opinion consequent upon this action are designed for the information of financial agents and contemplating investors in the securities of districts, and have not been sought as promotion papers in the interests of districts. Necessarily, some district enterprises are good from the business and engineering standpoint, and will be so spoken of. It may be that some are bad,—and, if so, it is expected they will be thus reported.

J. W. NANCE,
President State Association of Irrigation Districts.

298958

CORRESPONDENCE WITH LEADING FINANCIERS
OF SAN FRANCISCO.

PALACE HOTEL, SAN FRANCISCO,

June 12, 1891.

THOMAS BROWN, Esq.,

IGNATZ STEINHART, Esq.,

LLOYD TEVIS, Esq.,

A. MONTPELLIER, Esq.,

R. C. WOOLWORTH, Esq.,

And others.

GENTLEMEN :

In their endeavors to establish credit before the financial world, the Irrigation District authorities in this State have come to realize the necessity for having the several district schemes and organizations reported upon by experts whose qualifications and good standing would be vouched for by those persons controlling financial matters in San Francisco—the recognized center of business and money for California.

Each district has had its engineers and its attorneys, in whom the respective district authorities have all due confidence ; but the districts are many, and the experts of engineering who have participated in the work are several for each district.

The advisability of centering upon some one engineer to review the labors of the many heretofore engaged, for the information of the financial public, suggested by yourselves to several district representatives a short while ago, has been brought home to the district authorities. Speaking for many with whom I have communicated, they generally see it, and approve of it.

Now, in order to expedite matters, and to be able to suggest to the several District Boards some definite line of action, and lay before them the name of an engineer whom you and other controllers of local financial sentiment will recognize as of good professional and personal standing, I, as President of the Association of Irrigation Districts, profiting by the personal interviews had with you by representatives of our districts, address you the following inquiry :

In case the respective Boards of Directors of Irrigation Districts in this State employ Mr. Wm. Ham. Hall, consulting engineer, to report on the questions of water supply, plans and estimates for works, suitability of lands, and generally the physical, engineering and business questions involved in each district scheme, giving him all desired latitude for thoroughness of work, will you thereafter, when in the course of business you are applied to for information concerning the standing of such district, reply that its affairs have been examined by an engineer competent, in your opinion, for the task, and familiar with the subject in this State, and a man whom you believe to be trustworthy for the service ; in other words, that, in your opinion, he is an engineer on whose reports careful investors may rely as much as on those of any engineer in this line of business ?

Very respectfully yours,

A handwritten signature in cursive script, reading "J. W. Nance". The signature is written in dark ink and is positioned below the typed name of the signatory.

President State Association of Irrigation Districts.

To J. W. NANCE, ESQ.,

President State Association Irrigation Districts.

SIR :

We have read your foregoing letter of June 12, 1891, and we hereby answer in the affirmative relative to the inquiries respecting Mr. Hall.

In this connection we would suggest that it might be well for your Association to employ some competent attorney to investigate the status of the several districts, and assist Mr. Hall in his work.

Respectfully yours,

W. B. Brown

Wm. Davis

Wm. H. H. H.

R. B. Woolworth

A. Thompson

Robert Babui

Wm. Miller

James G. Fair
 J. R. Young,
 Daniel Meyer
 R. C. Woolworth
 J. W. Hellman

NOTE.—As will be seen, the above represent personal signatures. The gentlemen were addressed individually, and not as presidents and managers of banks; and so, in replying, they signed for themselves and not for the banks. But in order that the value of this certificate may be known to those persons not familiar with San Francisco banking organization, the following memorandum of identification is appended;

MR. THOMAS BROWN is Cashier and Manager of the Bank of California.

MR. LLOYD TEVIS is President and Manager of the Bank of Wells, Fargo & Co.

MR. IGNATZ STEINHART is the Manager of the Anglo-Californian Bank.

MR. A. MONTPELLIER is Cashier and Manager of the Grangers' Bank of California.

MR. R. C. WOOLWORTH is President and Manager of the Crocker-Woolworth Bank.

MR. I. W. HELLMAN is President and Manager of the Nevada Bank of California.

MR. ROBERT J. TOBIN is Secretary and Manager of the Hibernia Savings and Loan Society.

MR. L. GOTTIG is President and Manager of the German Savings and Loan Society.

MR. JAMES G. FAIR is President of the Mutual Savings Bank.

MR. S. P. YOUNG is Secretary and Manager of the California Safe Deposit and Trust Co.

MR. ALBERT MILLER is President and Manager of the San Francisco Savings Union.

MR. DANIEL MEYER is an individual Banker, and extensive Dealer in Securities.

LETTER OF TRANSMITTAL.

SAN FRANCISCO, CAL., Oct. 1st, 1891.

MR. J. W. NANCE,

President State Association, Irrigation Districts,

SIR :

In compliance with your request, and by authority of a resolution passed by the Board of Directors of the Alessandro Irrigation District on August 4th, last past, I herewith submit to you a report "on the questions of water-supply, plans and estimates for works, suitability of lands for irrigation, and generally the engineering and business questions involved in the construction of the works" for the Allessandro Irrigation District, in this State.

Very respectfully yours,

WM. HAM. HALL,

Consulting Civil Engineer.

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- A. Notes to the Report.
- B. Water-Right Agreement and Certificate.
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REPORT.

ALESSANDRO IRRIGATION DISTRICT.

Irrigation in Southern California was begun by the Spanish Mission priests in the early part of the present century, and through the labor of their Indian converts or disciples. The Roman Catholic Church in the Mexican province of California was shorn of temporal power in 1833; its cultivated lands were taken from it, and afterwards granted to political and military favorites. These lands were notably the irrigated orchards, vineyards and fields at the mission stations of San Fernando, San Gabriel, San Bernardino, San Juan Capistrano, San Jacinto, San Diego, and perhaps several others. One city had been founded also on the basis of irrigation industry,—the Pueblo of Los Angeles, in 1781. Here the irrigation waters were made community property from the start, and lands were apportioned to the settlers.

The means for construction at command of these early irrigators were, of course, crude and narrowly limited. Their irrigation experience was equally restricted and methods necessarily primitive. Their lack of knowledge of the soils and climate too placed them at great disadvantage. Nature seemed to say that the low-lying lands in the valleys were the best, for these maintained a verdure, an herbage for the support of stock, timber affording shade and yielding firewood. The higher lands in the valleys, and generally the lands in the higher valleys (not those in the hills or mountains), on the contrary, were desert-like; they produced only thorny cacti, sticky greasewood and *yerba santa*, white sage and black sage, occasionally bunch grass. Cattle could live, to be sure, on these dry plains and bench lands—that is, a few cattle to the square mile,—but the rolling lands and hills and the small valleys between these were the real grazing grounds.

The low lands of the large valleys were moistened by natural irrigation from springs and streams. But they were very often "low" only by comparison with other lands, or as respected the local water-supply. In actual elevation above the sea, the so-called "low lands" were frequently high, when compared to lands which themselves were high as regards ground moisture, water-supply and command of irrigation as it then was, in neighboring localities.

Now, aside from commonplace explanations of this statement, Southern California affords a number of familiar examples which in other countries would not be commonplace. The location of streams and water-supplies in this country is not governed by all the rules that control elsewhere. That is to say, streams burst forth in seemingly unnatural places,—as on wide open plains, high up on hillsides, or on the top of hills, or at the top edges of table lands, instead of in relatively low places, topographically, and at the base of slopes or in main cañons, as is generally the case in other countries.

The low lands, then, in Southern California were the naturally moist lands, and those easiest irrigated from springs and streams. The old Mexican population thought these were the best. The Mormons, who came into San Bernardino early in the "fifties," and were the representatives of the next stage of local irrigation development, also thought so. The early American settlers took up with this opinion, and it became difficult to dislodge.

Matters ran on thus until about 1870, when some speculators in colony enterprise took the notion that the higher lands were good—better than those locally low and moist, or easily irrigated. At any rate they were very cheap, and some of them could be irrigated by building better and more expensive irrigation works. Then followed the beginning, at Pasadena and at Riverside, of the systematic development, by irrigation on a large scale, of the *mesa*, or high plain lands, whose products now place Southern California in the front rank of horticultural regions.

The development has been one of works and one of culture

methods. Its succeeding notable steps have each been higher in class of works ; followed by higher, more perfect, culture methods ; and each has chosen higher and dryer lands, relatively, for its field,

The San Jacinto plain, lying partly, each, in San Diego and San Bernardino counties, is one of the latest scenes of this march in horticultural progress. The Alessandro Irrigation District occupies one end of this plain—about its highest lands. The works which are to supply it are of the highest class yet attempted for extended irrigation. Presumably, the culture methods to be employed will be profited by the experiences which have preceded it in this fruitful and progressive Southern California region.

“ The valley of the San Jacinto consists of an extensive plain, “ one thousand four hundred to one thousand eight hundred “ feet above the sea, covering some two hundred thousand “ acres, wonderfully uniform in surface, of gray and reddish “ soil, nearly surrounded by mountains, and dotted by irregu- “ lar conical hills and bald tables of granite, standing alone “ like islands in the sea. From a rim of this plateau one may “ look north and northwest down upon the Riverside plain and “ the San Bernardino Valley. To the northeast, east and “ southeast, the peaks, spurs, and outlying ridges that form the “ San Jacinto system of mountains, whose highest peak is “ eleven thousand feet in altitude, interpose a lofty barrier be- “ tween the valley and the Colorado desert. To the south lies “ Smith’s Mountain, a high east-and-west ridge. To the west “ and southwest are the low Temescal and Pinacarte Moun- “ tains.” (Report of the State Irrigation Engineer, California ; Part II, Irrigation in Southern California, pp. 47-48.)

The northern end of the San Jacinto plain, sloping from 1800 to 1450 feet above the sea, is in an almost complete amphitheatre of hills. These rise six or seven hundred feet above its higher edge, on the north, but at the western side sink to a mere rolling-land appearance, as viewed from the plain itself.

The Alessandro Irrigation District occupies the plain and sloping lands in this comparatively elevated plateau. It is twelve miles in length from east to west, and seven miles wide on north and south lines, and contains about 25,500 acres, or very nearly 40 square miles.

The boundaries follow section and quarter-section lines around the available and desirable lands, without strict regard to grade contours—for the irrigation water-supply is brought to and through it under pressure, and irregularities of elevation are thus, in water delivery, practically eliminated.

This district lies across the northern end of the Perris District, heretofore reported upon, and easterly therefrom, and is wholly in San Bernardino County, as will be seen by the general map.

Riverside, one of the very foremost horticultural neighborhoods in America, lies west of Alessandro, on a lower plain, and at the western foot of the intervening hill range, from two to six miles distant.

Redlands, another famous horticultural development of the region, is on a somewhat similar *mesa* plain sloping northward, at about the elevation of the middle part of the Alessandro tract, just over another range of hills, and six miles north from the eastern part of the district.

Alessandro District is all upon one plain, sloping south toward a basin whose immediate bottom is occupied by a great rugged cluster of granite hills—that is, the plain slopes from the surrounding hills to the base of this interior group in the San Jacinto Valley.

There is a low trough outlet on the west of the central hills, which goes down through Perris District to the San Jacinto river, as described in a former report ; and another on the east which leads to the basin of San Jacinto lake.

The Alessandro plain slopes at rates varying between 10 and 100 feet per mile. There are several outstanding granite hills in it, covering altogether about 600 acres of area.

A petition for the formation of the Alessandro Irrigation District was, as required by law, presented to the Board of Supervisors of San Bernardino County, on December 1st, 1890, and, there being no objection, it was granted. The statutory

election was held on January 3rd, 1891, whereat the first Board of Directors was chosen and the organization completed. The area embraced was about 25,550 acres, and there have been no changes of boundary or of acreage since.

Two maps are found herewith ; one, the larger scale, showing the topography and land subdivisions and irrigation system of works of the district itself ; and another, the smaller scale general map, showing the location and relation of the district to the older and better known irrigation neighborhoods of San Bernardino and San Diego counties, in its region.

The value of a security depends not only on the honesty of the debtor and the firmness of his binding to the creditor, but upon his ability to pay it when the time comes. This ability will depend, in the case of irrigation districts, on the success of irrigation industry in them. The bondholder will not want to take the lands of taxpayers in a district, pledged to him under the law, or to sell them for taxes to satisfy his claim, even if they are worth more than sufficient in the real estate market. He will want his interest and principal. He is as much concerned from the beginning in the success of irrigation in a district as its taxpayers are.

The success of irrigation, commercially, depends, in no small degree, on the necessity for it, as well as on the suitability of the site and climate. And the measure of this success will be enhanced or modified for each district, by the degree of adaptability of its conditions, compared to those of the various districts being developed at the same time. The promotion of an irrigation district is an enterprise governed by business principles, just as much as a commercial venture on the part of any individual. There is necessarily a rivalry between districts in process of development at the same time. It cannot be otherwise. Other things being equal, the district best adapted to irrigation in soil and climate will succeed ; while if the market for irrigated lands or for irrigation products is overstocked, the poorest district will be first to fail.

Bondholders and investors abroad recognize these facts. They want to know beforehand whether the case is one favora-

ble to success. Hence, I take up the question of adaptability to irrigation and necessity for it, in the case of Alessandro District. To those acquainted with the southern country, and with these lands and with this neighborhood, it may seem absurd to go into such questions for this case. Be it remembered by these, that a report of this character should be sufficiently full to meet every possible question, within its scope, which can be raised by those who know practically nothing of California or her industries. Irrigation district securities are seeking a market in Switzerland, for instance. It is, therefore, in part the Swiss demand for information on the subject that is to be met, rather than any local demand in California.

ADAPTABILITY TO IRRIGATION.

In my opinion, there are no equally large areas of land in Southern California materially better adapted, in surface and soils, to cultivations of high class, and by irrigation methods suited thereto and of the highest order, than some portions of the San Jacinto plateau plain.

For warmth of exposure, good drainage slope and richness of soil, a very large part of the Alessandro District ranks with the best. In smoothness of surface, also, as a general thing, these lands are favorable to economical preparation for irrigation, and succeeding cultivation thereby.

As already quoted, the State Irrigation Engineer reported the San Jacinto plateau valley as being "wonderfully uniform in surface"; and on another page of the report he wrote: "As a general thing, the soil of these valleys is excellent, and for the most part is directly traceable to the disintegration of granite."

This description is applicable, *verbatim*, to the lands of a large part of Alessandro District. With the exception of about 600 acres embracing some outstanding granite knolls in the plain, and 1,000 to 1,500 acres, somewhat cut by ravines and drainage ways, found principally along the northern edge of the district, and bordering the hills that lie behind it, we do not find much more evenly unbroken and favorable slopes for the class of irrigation here contemplated, than those of this district.

There is some knolly or "hog-wallow" land also, that requires more expense in preparing for irrigation than the smoothest and most evenly surfaced plains; but, on the whole, the surface configuration of the district is all that could be expected of so large an area of rich-soiled fruit land in Southern California. Lands of such soils and adaptabilities here, as a general thing, are more cut up by ravines and washes, and decidedly more rough and rugged of surface between these larger irregularities, than we find to be the case with those of Alessandro District. [See Note 1.]

Standing on lands at the western end of this district, one looks immediately upon the plain, but two to five miles away, and several hundred feet below, which more than all others, perhaps, has made for Southern California its reputation as an orange and lemon growing region, and has notably contributed, also, to its record in the line of the olive, fig, and raisin industries. It is Riverside.

Just as in case of Perris District, lying opposite the southern end of the Riverside plain, so Alessandro District, lying opposite the middle and northern part of Riverside, can claim to have soils of almost identical origin and formation, and consequent adaptabilities, with it. As Riverside surface soils were in no small measure made by washings from the western face of a low granite hill range, so the surface soils of Alessandro District find their origin in washes from the eastern face of the same range, and southern slope of its north and east continuation. As a matter of fact, the Alessandro *mesa*, on the eastern slope, is so near the crest of the hill range whose western footing is in Riverside, that some natural cañon drainage-ways have cut through the hills from this eastern plateau, and washings from it have for ages been annually contributed direct to the soils of the lower orange-growing plain. Alessandro soils, then, have not only in great measure an origin in common with those of Riverside, but are in some measure themselves the origin of Riverside's fertility.

Of the Alessandro District, 14,000 to 15,000 acres have soils practically of the "red mesa" kind. These cover the main

portion and the western end of the district. The slopes at the eastern end, to the extent of 3,000 to 4,000 acres, are of rich, fine-sandy loam, gray and light drab in color. The lower and flatter lands towards the southern edge (and opposite the middle part of the district, rather than at the extreme east and west ends,) are heavier and darker in soil, and in a limited degree have an adobe nature for 1,000 to 2,000 acres of area. The balance of the acreage is made up, for the most part, of various admixtures of these more distinctive soils, and in small part of recent gray colored, coarse washings from the adjacent granite hills.

The "red mesa" soils, as a general rule, are less heavy and distinctly marked in character, than are those of Riverside and Redlands, but they are at least equally well adapted to handling under irrigation, and apparently as suitable to the most desired horticultural growths. Large areas of these soils closely resemble and are doubtless almost identical in composition with the admixtures of recent granite wash with the mesa clay, found along the eastern and higher parts of the Riverside plain, and towards its southern end.

The rich, sandy loams of the eastern end of the district have a local origin. They are on the southern footings of a hill range, that has from its northern and eastern flanks sent a similar alluvial detritus down to the neighborhood of Old San Bernardino, where is another belt of specially productive country, now much grown to fruits and vines, under irrigation. The ruling kinds of soil in this Alessandro District, therefore, have the ingredients of the distinct classes of fruit lands already well proven at two of the best known neighborhoods in Southern California.

The slopes of the Alessandro plain are, in my opinion, specially well adapted to cultivation in citrus fruits, and also to the olive, fig, and vine. There may be some question of the adaptability of the lower and flatter lands of the district, to the extent of several thousand acres, to the growing of citrus fruit, and some other of the less hardy varieties of other fruits. There are always such differences in every locality. The warmer, better drained slopes, locally, are always more desir-

able than flatter land at their footings, for the more delicate growths. So far as soil composition and surface form is concerned, about all of Alessandro District is good fruit land, but some parts are better than others.

The soils are deep, rich, and of character to take water freely, without being wastefully absorptive. There are no large districts adapted to this class of production, materially more free from waste land than the Alessandro.

NECESSITY FOR IRRIGATION.

Alessandro District is in the undisputed zone of irrigation in Southern California. There are no differences of opinion as to the necessity of artificial watering of all lands in this region, except some small areas made moist by percolation from adjacent streams and springs, and except lands in some higher mountain valleys. And, moreover, the naturally moist lands in Southern California are not suited to the growth of the higher horticultural products.

The orange, lemon, lime, olive, fig and vine, especially refuse to thrive and bear well on moist lands. They soon become diseased; the crops are spoiled; the plants are short lived; the fruit, never of fine quality. Some small areas in high mountain valleys, or on elevated plateaus in this region, produce good apples, pears and other hardy fruits, without irrigation. But these localities are subjected to decidedly greater rainfall and cooler atmosphere, than those at elevations that admit of citrus and other delicate fruit growing.

The citrus fruit belt of Southern California is above all others the irrigation zone of that country. If we had to localize it, narrowly but continuously, it might be described as a strip from 5 to 10 miles in width; following the southern and western footing of the Sierra Madre, San Bernardino, San Jacinto, and San Diego Mountains, through Los Angeles, San Bernardino, and San Diego Counties; and lying between 400 and 1500 feet above the sea at its western end; between 500 and 2500, in its middle course; and from almost sea level to 1500 feet of elevation at its southern extremity.

As a matter of fact, this belt does not include all the success-

ful citrus growing neighborhoods in the great region through which it sweeps ; but it embraces the largest and most successful. Neither is it true that all neighborhoods in it are suitable to this class of culture ; on the contrary, the really favorable places are simply scattered in series through it.

The Alessandro District is just at the middle part of this belt where it is farthest from the sea ; is subjected to the most drying and hottest atmosphere, and receives almost its least amount of rainfall. [See Note 2.]

It is in the region where the irrigation ditch so frequently is a demarkation between extreme apparent sterility and intense and showy productiveness. On good soils, irrigation here maintains full populations in luxury, and with most pleasing surroundings, in localities where man could not exist without such artificial using of water in agriculture, or without help from elsewhere. [See Note 4.]

Differing somewhat from lands of its neighbor, the Perris District, there would, on account of soil conditions, be an absolute necessity for irrigation on lands of the Alessandro District, quite generally, even if subjected to a materially greater rainfall than the region receives. The heavier, "red mesa" character which the larger area of Alessandro lands presents, carries with it a lower degree of absorptiveness and power to retain moisture. A materially larger part of rainfall on the greater portion of Alessandro lands is and always will be shed off as surface drainage. Soils of this character cannot be cultivated so as to receive more than a comparatively limited quantity of water at one time ; they do not become wet from rain or irrigation, to any considerable depth. Ground waters under them are at great depths below the surface. There is in the best lands of this character always a body of almost dry earth between the surface soil, wetted either naturally or artificially, and the sub-soils dampened by moisture rising from ground-waters below. It is this characteristic that renders them "warm," in the language of the orchardist : keeps them particularly free from frost ; and contributes largely to adapt them specially to citrus fruit growing. But they absolutely require artificial waterings, which must be applied regularly, oftener than on some more absorptive soils, in less volumes at one time, and through a longer season of irrigation.

This character being attributed in a medium but not extreme degree to a larger part of Alessandro lands, we have here a necessity for irrigation, born both of rain deficiency and special soil requirement. It is the result of scant rainfall, of its presentation all in a few months of each year, of the excessive dryness of the atmosphere throughout the growing months for vegetation, of the positive insufficiency of water in, and inability of the soil to receive sufficient to supply an exhausting vegetation for longer than a few weeks at a time.

To the thoughtful and intelligent student of agriculture, to the expert in irrigation, or to the practical irrigator, there could, on these accounts, be no doubt of the necessity for and value of irrigation in the Alessandro District, even though experience had not already actually proven these points there.

WATER SUPPLY.

The Alessandro District, in matter of water supply, is a customer of the Bear Valley Irrigation Company, one of the largest and most powerful water-supplying companies, in respect to financial and water resources, of Southern California. This company's water-right and reservoir privileges cover a wide field in San Bernardino and San Diego counties. It has extensive works already constructed, others in course of building, and still others in contemplation and planning.

The question of water supply for the district, then, is one of ability and good faith on the part of the B. V. I. Co. to fulfill its agreement; and that involves a consideration of the company's rights, privileges and abilities, and of its other engagements, and programme for future development and operations.

This water-supplying company is one of notable resources and successes. But that it is going to be entirely capable of meeting all its water engagements is an affirmative opinion of great responsibility. These engagements, however, are graded as to priority. And so, the writer of this report has considered the subject as one of water-supply and delivery book-keeping, in order that an opinion for the purposes of this special report might be arrived at.

The district holds its water privileges under an agreement

with the Bear Valley Irrigation Company, dated May 6th, 1891. By this engagement, the company has become a contractor to deliver at various commanding points in the district a supply of water sufficient for its irrigation, at the rate of one inch of flow to each four acres of land. This is a larger water right than almost any other irrigation neighborhood in Southern California has. The usual measure of such rights ranges between an inch to five, and an inch to ten acres. One to five is considered a first-rate right for any kind of cultivation, where delivery and distribution works are of high class, and cultivation and irrigation methods are not primitive and wasteful, and lands not specially absorptive. [See Notes 7 and 8.]

The Alessandro works are most economical in delivery and distribution; the lands are nowhere specially absorptive in character, and for the most part are rather the reverse (or will be when once wetted); crop cultivation in the district is not at all likely to be (in other than small proportion, only) of character such as to conduce to wasteful methods or habits in irrigation; the class of irrigators is almost certain to be specially intelligent, thrifty, and careful not to over-irrigate. Hence, I am of the opinion that the B. V. I. Co. water certificates call for all the water which this district can, in any reason, require for the highest and most remunerative class of irrigation practiced in this country.

The water rights sold by the Bear Valley Irrigation Company are represented by certificates which have something the character of special water-stock shares. There have been two general issues of these,—Classes "A" and "B," respectively. Those received by the Alessandro District, under the contract aforesaid, are of Class B. They call for a supply of one-eighth of an inch to each certificate, and the district has acquired 51,000 such certificates, or two to each of its 25,500 acres. The maximum rate of delivery is fixed at the figure just stated, and the total amount to be furnished in any year, under any one certificate, is one acre-foot, or 43,560 cubic feet of water.

The water-supply contract and the text of the water-right certificates are annexed in full to this report, and hence it is unnecessary to review details of the subject under the present heading. The originals plainly, and in good order, set forth all significant conditions of the service.

This seems to have been the only way that a supply of water could have been had for this body of land, within moderate means. Conditions are such in the special region, that water-supply projects require great capital and adroit management. No single irrigation district could secure capital sufficient to carry out such a project as the B. V. I. Co. has carried out and is perfecting here. Public corporations, with popularly elected officers, are in their nature incapable of that thorough and elastic business management necessary for success in such enterprises under conditions of the kind which govern in this State.

For the purpose of this report, I have made an examination and study of the present and probable future water-supplying ability of the Bear Valley Irrigation Company, of their engagements to furnish water, and their program or scheme of works, etc., to fulfill these engagements. And I am of the opinion that this company can and will fulfill its contract now existing, to supply the Alessandro Irrigation District, and in accordance with the terms of the water certificates issued to the district under that contract.

This subject might be treated more at length, and the mere opinion be substantiated by demonstration, but such treatment would very much lengthen this report, and make it less readable. In a special paper on the water-supplying capabilities, at large, of the B. V. I. Co., now in course of preparation by the writer hereof, the complete review will be presented. The foregoing opinion should be regarded as quite full and decided enough for all purposes of this particular district enterprise, so far as the water-supply question affects it.

WATER DUTY AND DELIVERY.

In the preceding article I have expressed the opinion that this district had secured an ample water supply, by its purchase from the B. V. I. Co. of two Class B water-right certificates for each acre of district area.

Certificates of this class limit the total quantity of water

furnished per year to one foot in depth, and the rate of delivery to an inch of flow to eight acres. The Alessandro District, having two certificates to the acre, is entitled to receive twice this depth of service, and at double the above rate of delivery.

The maximum service, then, would be at the rate of about .3 foot in 30 days. This, as a maximum monthly demand, is about 15 per cent of the annual volume. Now, experience has shown that the greatest monthly demand, where the supply is at the rate of one inch to five acres on fully developed irrigation of this class, is at the rate of 18 per cent of the total annual consumption. Hence, it may be seen at a glance that the duty allowed for in Alessandro District is quite sufficient.

The rate of delivery and commencement of use of water in succeeding years, under the contract, is, in terms of maximum service, as follows:

Time of Commencement.	No. of Certificates.	No. of Acres.	No. of Inches.
June 1st, 1891.....	4,000	2,000	500
April 1st, 1892.....	6,000	3,000	750
“ 1st, 1893.....	6,000	3,000	750
“ 1st, 1894.....	6,000	3,000	750
“ 1st, 1895.....	6,000	3,000	750
“ 1st, 1896.....	6,000	3,000	750
“ 1st, 1897.....	6,000	3,000	750
“ 1st, 1898.....	6,000	3,000	750
“ 1st, 1899.....	5,000	2,500	625
	<hr/> 51,000	<hr/> 25,500	<hr/> 6,375

WORKS AND COSTS.

The case of Alessandro District is different in an important respect from that of other districts heretofore reported upon. Its water supply, delivery, and, for the greater portion of its area, its distribution works also, are built virtually by contract at a prefixed price, and for the amount of bonds already voted. So, for one important purpose of this report, it does not much matter what the actual cost of construction of works may be; for the district is bonded to the extent of \$30 per acre—no more and no less.

But although the full extent of district indebtedness is thus determined from the start, the question of value of works still remains of interest as a factor, both directly and indirectly, in the value of the security offered for the bonded debt, even though prefixed and limited as above.

To well understand the situation as to works and cost of works for the irrigation development of Alessandro District, it is necessary to know something of the history of the enterprise. The Bear Valley Land and Water Company was incorporated in 1883, with a capital stock of \$360,000, divided into 3600 shares. It was a water-supplying company, and built and owned the Bear Valley dam and reservoir, and other works.

In July, 1890, the Bear Valley and Alessandro Development Company was formed, with a capital stock of \$400,000, and with the objects, in general terms, of (1) acquiring control of the B. V. L. & W. Company, (2) buying lands suitable for irrigation, (3) delivering and distributing Bear Valley water to them, and (4) selling them, thus improved, at a profit.

A tract of about 21,000 acres, now within the Alessandro district, was purchased, and 2000 of the 3600 shares of the B. V. L. & W. Co. stock was secured. The construction of a main conduit was commenced, to deliver waters from the Santa Ana river to the land bought, which was called the Alessandro tract. The plan was to fully deliver and distribute water to these lands, and sell them in small tracts, for enough to pay a profit on cost of land and the water service, and with contracts to pay a yearly water rental that would thereafter yield a revenue to the company.

In November, 1890, the Bear Valley Irrigation Company was organized, with a capital stock of \$4,000,000, and it took all the rights, privileges, works, lands and contracts of both the B. V. L. & W. Co. and the B. V. & A. D. Co. The latter company took stock of the new company for its properties, and now holds a controlling interest in it. The new company was organized to carry on the business of both companies which had preceded it, and has continued to do so.

In December, 1890, and January, 1891, the Alessandro Irri

gation district, embracing the 21,000-acre Alessandro tract of the B. V. I. Co., and about 4500 acres of other owners, was formed; and under the subsequent agreement for water-rights hereinbefore explained, the B. V. I. Co. became a contractor to deliver water to and upon the district along certain main lines of supply. This agreement was, of course, for the entire district, and involved the construction by the B. V. I. Co. of all necessary main works.

The Board of Directors of the district in June (1891) adopted a resolution to the effect that "the owner of every ten-acre lot in the Alessandro Irrigation District, before taking water on said lot, must first pay his exact *pro rata* of the expense of piping, or conveying in brick flumes, the water from the Bear Valley Irrigation Company's pipe lines or canal, to the highest corner of said lot. Said pipe line or brick flume to become the property of the Alessandro Irrigation District, and to be thereafter maintained by said district."

Meanwhile, the B. V. I. Co. and its predecessor, the B. V. & A. D. Co., had been dividing its 21,000-acre tract, putting in distribution works for, and selling it in lots of 10 acres each. In making these sales the company contracted to construct works and lay pipe lines to deliver water, at the rate of one inch to four acres, at the highest point of the (10-acre) tract sold, in each case, and the first payments on these sales were not due until such works had been constructed. The building of these distributaries has, since commencement in the early part of the present year, been continuously pressed forward, until now the greater part of the 21,000-acre tract of the B. V. I. Co. is subdivided, and pipe service provided for a large portion of it.

These distribution works are of the very best class for the purpose. The B. V. I. Co. receives its return for them in its land sales. Other land owners than those buying from this company have to pay their share of cost of such works as will serve their lands, or put in an independent distribution system for themselves. In any event, in order to subdivide and sell lands to advantage, all the works must come up to the standard now set. And, finally, as a matter of fact, there is harmony amongst the owners of lands in the district, and distribution construction is going forward.

Hence—as all the distributaries become the property of the district, and all the main works remain the property of the B. V. I. Co., with right of use thereof for delivery purposes contracted to the district—the cost of district works and waters will be limited to the \$30 per acre already contracted and paid, and the district will have the use of all essential works (under its contract for water-delivery) of a high order.

The water-supply for Alessandro District, as well as that, thus far, for all customers of the B. V. I. Co. on the plains of San Jacinto, comes by a steel pipe, 10 miles in length, from Santa Ana river and Mill creek above Redlands, and through a tunnel in the intervening dividing ridge, to a point just above the northern corner of the Alessandro District, as shown on the maps. Thence it is conducted in concrete lined canals, on grade so as to command the slopes below. Main pipe lines (of steel, where under pressure, and of vitrified earthen-ware, where not under pressure) serve for sub-delivery through the tract, on routes governed by the topography and location of demand. From these, distribution is made on every (almost) quarter-mile line, down the slope from north to south, so as to serve each 10-acre tract at its highest corner. These distributaries are, for the most part, of iron-stone vitrified clay pipe, laid with cement joints, but some cement pipe has been used. The sizes of distributaries range from 6 to 14 inches in diameter, and of main pipe from 12 to 24 inches.

West of the tunnel, the B. V. I. Co. has thus far expended :

On Main (Company) Works.....	\$100,651 62
On Distribution (District) Works.....	80,026 30
	<hr/>
Total.....	\$180,677 92

To this amount a sum equal to about five per cent is to be added for engineering and surveying for works. [See Exhibit I.]

The cost of the distribution system for 4200 acres, of which account was kept, including all engineering and other contingent expense, was \$76,251.94, or \$18.15 per acre thus prepared to be served.

Distribution to each irrigator is made by “well outlets” of

14-inch vitrified pipe, in which the water is caused to rise and overflow through a weir lip into a surface irrigating flume. An iron sliding gate, with its frame and seat specially cemented into the well piece, is actuated to shut off the onward flow of water in the pipe below, thus causing as much as desired to rise in the well and flow over the weir.

I have viewed these works in construction, have looked into the plans, and am of the opinion that the system as a whole is well designed, and will be efficient to the end desired. In matter of cost, as already explained, it does not directly affect the district or its securities. [See Note 10.]

Efficiency and completeness insured, as I believe is done in this case, it matters not, so far as the district is concerned, whether the cultivator has had to pay, in buying his land, \$18 or even \$28 per acre, for distributing water to its highest point.

In my opinion, the distribution system now being placed in the Alessandro District is the most complete and best for orchard and vineyard irrigation service in California. In expressing this opinion, the writer does not reflect slightly on any other neighborhood or system of works. There are others that are excellent. The simple fact is that this Alessandro work is the newest of its class, and is being carried out under circumstances that make it pay its projectors to do it as completely and as well as it can be done, in the light of experiences had thus far, and within any reasonable amount of cost, for the purpose.

I do not undertake to consider in detail the cost of water supply to this district. One hundred and twenty dollars per inch, or \$6,000 the cubic foot per second of flow, during the period of maximum demand in irrigation, is not a high cost for water supply and delivery of this character, on lands of this kind, in the citrus belt of Southern California. It is decidedly less than some other very successful orange-growing neighborhoods have paid; and it is less than this district could in any other way have secured a supply for. [See Note 11.]

DISTRICT VALUATION.

Referring to the ASSESSMENT AND TAX STATEMENT embodied in Exhibit IV, it will be seen that, in the current year, valuations have been placed on property for purposes of taxation in the district, as follows :

Farming lands.....	\$2,396,819
Improvements thereon.....	1,520
Town property.....	18,542
Improvements thereon.....	200
R. R. right of way and track.....	18,955
	<hr/>
	\$2,436,036

The mean valuation of farming lands is \$95.87 per acre ; the highest valuation of any 40 acres is at the rate of \$100 ; the lowest, \$33.50 ; the highest for 230 acres is \$100 per acre ; the lowest, \$37.45. These valuations, of course, include the water-rights.

These rates were up to the selling prices of these lands at the time of the tax levy. Now, the ordinary price is \$120 per acre. The actual value of this class of lands, with such a water supply and distribution service, in this region, in my judgment, is not less than \$300 per acre. Compared to other lands and water-rights which now find sale purely for fruit raising as an industry, within five miles of this district, at prices ranging from \$300 to \$600 per acre, I fail to see wherein the difference can be, except that of immediate neighborhood advantage and established sentiment, and these influences will, in all probability, soon be equalized.

But these lands are worth \$300 per acre for what they will produce. Water is already delivered in this district ; irrigation is under way ; several thousand acres are already set out to oranges, and other fine fruits and vines. The fact that these will thrive here cannot, in my judgment, be questioned. The place is but a reduplication of soils, exposures, elevations and other conditions under which such horticultural thrift is found in the immediate neighborhood.

The fact that but last year these San Jacinto lands were bought for 10 to 20 dollars per acre, and that, without water, they are not worth more than that now, cuts no figure in this connection. The fact is, they now have water-rights and high-class works. If we accept this fact at all, we must accept it for all it is worth in other and similar cases in the immediate neighborhood, under similar conditions. The fact that they can now be bought for \$120 per acre from the developing company is not to the point. The company is selling a portion of these lands at what it deems a fair profit to it, to make immediate sales and get population, on which the value of the whole depends.

Values here on such lands depend on water well delivered and distributed, and on population to use it. The lands are, we might even say, valueless without water. But with the water delivered they are actually worth as much as any other similar lands with similar water-rights—other conditions being equal. [See Note 12.]

In 1870 there was no Riverside. From 1871 to 1876 lands were preëmpted on that plain, upon government terms (\$2.50 per acre within the S. P. railroad grant). In 1884 lands above the original Riverside canals, without water-rights, could be bought at \$5.00 per acre. Now, with water-rights, there is not an acre of even moderately good cultivable land that can be had on that plain for less than \$300 per acre, bare. This is only two to six miles from the Alessandro District.

Commencing with 1881, an exactly parallel history has been made at Redlands, but 6 to 10 miles from Alessandro District, and at about the same elevation. Now the Redlands neighborhood is a far-reaching horticultural park. The most thrifty and luxurious orchards and vineyards, with many houses even elegant as well as substantial, occupy a space of five to six square miles. There is no good land with good water-rights here that can be bought, unimproved, for less than \$250 per acre, and \$400 to \$500 is nearer the mark for that which compares well in soil and surface with the greater portion of the Alessandro tract.

In 1889 there was about 3000 acres of orange orchards in Riverside proper. No inconsiderable portion of this was but

just commencing to yield. A comparatively small portion, only, was in full bearing and up to its prime. But there were 1480 carloads of this fruit, valued at \$1,184,000, shipped from Riverside that year, that had been gathered from those 3000 acres, or a gross return of \$395 per acre. The raisin crop of that year has been returned at an aggregate value of \$600,000. This would make, with other fruits, fully \$1,800,000 from the 6000 acres which Riverside occupies, or \$300 per acre, over all, though the greater area was not yet producing.

Other notable examples could be cited. It is a well-known and generally conceded fact, that orange orchards well cared for in this special region, when in full bearing, return from \$250 to \$500 per year, net, to the acre.

In my opinion the Alessandro District lands, having works up to the best standard, and a water-right as full as need be for any purpose, and being suited to the best horticultural growths, are, judged by the Redlands and Riverside standards and experience, worth now, commercially, an average of at least \$150 per acre ; within 10 years they should be worth \$300 per acre ; and within 10 years thereafter, \$450.

All such values are subject to modification, under the working of the law of supply and demand. These figures are based on proven productive ability, and with the allowance of liberal discount for safety. They are independent of value of improvements which may be placed or grown on the lands, and of values dependent on social, climatic, or neighborhood advantages for mere residence purpose.

The values of improvements on farming lands in such cases develop for taxation in greater ratios than those of the lands themselves. There was at time of assessment in this fiscal year practically no improvement on the lands of the Alessandro District. But when these are cultivated in 10 and 20-acre orchards and vineyards, as they will be under thorough irrigation, it is reasonable to assume that there will be at least \$2000 worth of improvements on each ; or say, \$150 per acre, on the average.

Orange orchards, for instance, are improvements, for pur-

poses of tax revenue ; and this past year they were valued in state and county taxation, in this region, at from \$80 to \$150 per acre, according to age and condition of bearing. Vineyards, also, found rating at from \$75 to \$100 per acre, on the assessor's rolls, in addition to land values. The residence houses that are built in neighborhoods of this class, when the orchards and vineyards come into bearing, leaving out the better ones, range in cost from \$1200 to \$4500 on a 10-acre or 20-acre tract. Assessed at one-third cost, their taxed valuation would be \$400 to \$1500, or \$25 to \$100 per acre for dwelling improvements, counting a house to every 15 acres.

The \$150 per acre for all improvements, when the district is fully developed,—say in twenty years—would produce a valuation on, say, 24,000 of the 25,500 acres, of \$3,600,000.

The corresponding rural population would be about 5,000 persons. This would justify a town population of about 2,500 people ; and this, in turn, a realty value of about \$1,250,000 for town property. Upon these assumptions we may, by way of studying the possible future ability to pay its debts, forecast values for Alessandro District about as follows :

	When Irrigation well commences.	In 10 years thereafter.	In 20 years.
Farming Lands	\$3,000,000	\$6,000,000	\$9,000,000
Improvements	150,000	1,500,000	3,000,000
Town Property and Improvements	200,000	600,000	1,200,000
	<hr/> \$3,350,000	<hr/> \$8,100,000	<hr/> \$13,200,000

I believe these to be conservative estimates and predictions for the times to which they apply.

It must always be remembered, in studying the question of values in such districts, that it is the water united with lands of certain characters, subject to particular climatic conditions, and in the hands of a specially thrifty population, that constitutes the basis.

A district of this class is essentially a development enter-

prise. Its values are created with the money that is put into it as a project. To look for real value, as a basis of credit, behind the created values of the development work, is to look for that which no one for a moment maintains is in existence.

BONDED INDEBTEDNESS.

The Alessandro District bonds having been issued to the extent of \$765,000 for water delivered, (distribution works, thrown in, as it were,) there is now, as security for the loan contemplated by the law, property now assessed on a valuation of \$2,436,036; of which \$2,396,819 is the rated value of the farming lands. In my opinion, these lands are now actually worth \$3,000,000.

Considering all the property pledged under the law, on the basis of figures in the preceding article, the district which is bonded for \$30 per acre, is now worth about \$131 per acre; within 10 years will be worth \$318; and within 10 years additional \$518. Arrived at, in a general way, as above written, these valuations are from 30 to 50 per cent within the limits of probabilities which, in my judgment, may well be expected in the light of development precedents in this region; even allowing yet for immense shrinkage of profits in the industries on which all values here depend. [See Notes 13 and 14.]

PRESENT FINANCIAL CONDITION.

The finances of this district present a very simple problem, in so far as the present report is concerned. On the 7th of March, 1891, by unanimous vote of the electors, the Board of Directors were authorized to issue and sell bonds of the district to the par value of \$765,000; which was at the rate of \$30 per acre on the entire area.

This was done on May 6th, and on the same day the entire issue was paid at par to the Bear Valley Irrigation Company for water rights (represented by 51,000 Class B certificates) and water delivered, as per the terms of the contract already explained. [See Exhibit V.]

During this first year of district existence, an assessment

of property, for purposes of taxation, has been made at the time of year prescribed in the law, but the time for collecting taxes has not yet come. For this reason the accounts known as the General Fund and the Bond Fund, which are credited with tax receipts to meet, respectively, current administrative expenses, and the interest on and principal of bonds, have not as yet been opened. [See Exhibit III.]

The tax rate has been fixed at \$2.25 on the \$100, and the total levy for district purposes is \$54,384.32.

FUTURE FINANCIAL OUTLOOK.

The total assessed valuation of the property in this district is now \$2,436,036. With the realization of irrigation now in rapid progress, and in large degree, practically, consummated under the plans described, and with the water-rights contracted for, in my opinion, this taxed valuation, for the purposes of district enterprise, is altogether reasonable. It is a fair index of actual values at the present time, rated on holdings now in individual ownership and gauged by precedent, the most conclusive and applicable in matters of property assessment in this country. It is about 70 per cent of the present fair commercial value which I have arrived at in the manner explained in the preceding article. With this as a first step, it will, in my judgment, be reasonable to assume that the assessed value may, 10 years from now, be found at about 60 per cent of the commercial value for that time which I have undertaken to foretell. And, finally, for the period still 10 years later, or 20 years from now, in my judgment, we may reasonably expect to see the assessed value at as much as 50 per cent of the presumed commercial value for that time. A brief statement of estimates, in this line, based on the foregoing, would appear as follows :

Period of Time.	Commercial Values.	Per cent of Com. Value.	Assessed Valuation.
When Irrigation commences, (now).....	\$ 3,350,000	70—	\$2,436,036
10 years from now.....	8,100,000	60	4,860,000
10 years, still later.....	13,200,000	50	6,600,000

The above projected valuations are intended to cover all

classes of property taxable in the district, but they make no allowance for increase of values for railway property which is now taxed. They are not to be taken as indicative of values of farming lands alone. The foregoing article on *District Valuation* has dealt with this point.

For purposes of an illustration of how this district may meet its bonded debt, I assume that when the time comes for levying the first tax, from the proceeds of which, under the law, the first payment of the principal is to be made—the eleventh year from the time of issuing bonds—the taxed valuation of property in it will be \$4,500,000 and in the last year for such payment—the twentieth from time of issue—this basis of revenue will be \$6,500,000. Then, allowing the increase to be uniform, for the period—at the rate of \$200,000 per year—and observing the provisions of the law about percentages of the par values of bonds to be paid off each year, I project an assessment and tax-levy schedule on bond account, for those years, and embody it in Exhibit II.

ADDITIONAL BOND ISSUE.

The issue of \$765,000 in bonds by this district was made on the basis of its full area—25,500 acres. Since this action there has been no change of district boundaries or area. Under the contract with the Bear Valley Irrigation Company, the development methods followed by that company and other large land owners, and the resolution of the Board of Directors of the district, all as heretofore set forth, the district will be fully supplied with water and works complete, at the cost of these bonds already issued. Hence, unless there is failure on the part of the B. V. I. Co., and I see no reason to regard it as otherwise than a thoroughly reliable contract or in this business, there can be no necessity for any further issue of bonds by this district on the basis of its present acreage. There might be an increase of area, by addition of more lands some time, in which event there would, of course, have to be a further issue of bonds for water rights and works on the basis of the added acres.

RIGHT OF WAY MATTERS.

This district, as must be apparent from the foregoing, has had no dealings, and consequently no trouble and no expense, on the score of right of way for works. The contracting water company has met all such questions on its main lines of supply to and through the district, and the property owners within its borders construct or pay for distributaries through lands owned by themselves, and, of course, grant right of way for the pipes thus laid.

CONTRACTS AND CONTRACT RATES.

For the same reason, there is no statement of contracts and contract rates on district account to be presented, other than that concerning the one contract made with the Bear Valley Irrigation Company. The water privileges controlled by this contracting company, and available for immediate utilization in supplying Alessandro District, are certain rights in the waters of Santa Ana river and Mill Creek, and the reservoired waters of Bear Creek,—all on the western slope of the San Bernardino mountains. From a commanding point in this locality the present supply is brought by the pipe and tunnel line heretofore described. The company has just located and commenced construction on a line of conduit involving canals, tunnels and pipe lines of great cost, to bring the waters of Whitewater river, which now flow from the eastern face of the San Bernardino mountains out into Colorado desert, around the mountain, through San Gorgonio pass, and, piercing the ridge east of Alessandro District, into San Jacinto valley.

These two lines, developed by the addition of more pipes and enlargement of the open conduits, as necessities and engagements require, will be the main routes of delivery of Bear Valley I. Company waters to all its customers on the higher lands in the San Jacinto valley, the Alessandro and Perris Districts being the chiefest. It has another source commanding service to lower-lying lands in this region. The main works to and through the lands of its customers, built by the B. V. I. Co.,

remain its property, subject to and devoted to use in performing its contracts to the customer, in each case. Its contract is to deliver and furnish water to the Alessandro District, not to build works for it. The works which the district will own are those for distribution, and these are built by the land owners individually—the B. V. I. Co. among the number—and are presented to the district without charge.

COST OF THIS IRRIGATION.

In like manner, the question of cost of irrigation in this district is greatly simplified. Thirty dollars per acre covers the cost of water delivered. The actual cost of the B. V. I. Co. works to effect this service is yet unknown, even to the company itself. It is sufficient for the purposes of this report to say, that Alessandro District could not have secured a water supply by any other means at any less cost, even if it could have done so at all.

If we assume, as is not unlikely to be the case, that main works for the full service, *pro rata*, of Alessandro District, will cost the B. V. I. Co. as much as \$17 per acre of the district area, the cost of this irrigation system, including the distributary works at \$18 per acre, as already reported, when looked at merely from the engineering standpoint, will have been \$35 per acre. Taking lands worth certainly less than \$20 per acre without water, and making them worth, immediately, really \$150 per acre, works for the purpose might be regarded as cheap at much more than the above possible cost. The land owner in this district ultimately will have paid for works and water rights, in purchase of land and in payment of bonds, \$48 per acre,—that is, \$18 as part of land cost, and \$30 for water and delivery.

CHARACTER OF THIS WORK.

The works designed and in construction to serve this district are of a kind as yet peculiar to Southern California. This class of irrigation construction, in the present stage of the social and material growth of our country, is commercially prac-

ticable, on a large scale, only under conditions similar to those found there. Moreover, the element of speculation must be present in the development enterprise, and conditions must favor this. Whether it is speculation on the part of an individual, a private corporation, or a community organized under a district or other law, does not so very much matter. The essential point is that those who in the initial stages of the enterprise—the first years of development—assume the risk and perform the labor, shall see their way clear to making money by the venture. The cost of water-rights and irrigation works has to be added to the cost of lands served, and the limit of subsequent land value over total cost must be great enough to show a large margin of profit in the initial operation. The profits from irrigation industry itself must be left to the cultivator, who is the actor in the subsequent phase of progress.

The great margin of profit in enhanced land values, which an expenditure of \$25 to \$50 per acre for works makes necessary, is with absolute certainty to be found only where the raising of fine fruits is, by irrigation, made practicable on lands primarily of little cost. Southern California and localities in the Central and Northern part of this State present conditions whereunder this is possible. Here are found, dry and desolate lands and soils, with exposures suited to the growth and maturing of the very finest and most delicate fruits, and climatic conditions that are essential to such production, if only moisture is properly applied.

But these are not all that is necessary to insure full measures of success in that horticultural practice upon which high-class and high-cost irrigation development enterprises depend. Good and suitable soils, abundant water-rights, good works and favorable climate for the growth and ripening of fine fruits will not alone, however much advertised, at the present stage of social growth, promptly bring to an irrigation neighborhood the population necessary to work out those successes which create the high values of land wherein lie the incentive for first action in such enterprise.

Neither the irrigator nor the horticulturist, pure and simple, nor yet the laborer, farm hand, nor farmer, represents the character of immigration essential to the making of such com-

munities as take \$200 to \$400 per acre per year off of irrigated lands in Southern California, and have built up from nothing, cash land valuations ranging between \$500 and \$1,000 per acre, unimproved.

That country has been made, and this species of enterprise has been made possible, by another character of man, who has come to it because he can live there comfortably. It is not climatic advantage as affects horticultural growth, alone, which he finds there, but as affecting human life in the horticultural neighborhood.

The climate and landscape surroundings of the localities referred to in California, and the facilities for pleasant change, are such as not only to make possible, but to invite, the residence of a more intelligent, energetic, ingenious and thrifty class of people to engage in irrigation than are found elsewhere as irrigators. They come to these neighborhoods with capital—some large, some small, so far as money goes—but nearly all with some capital in money, and with much more than the old-fashioned agriculturist's or of the foreign irrigator's capital of intelligence, pluck, and business training.

It is the presence and continued coming of people of this character, in controlling numbers, that makes commercially practicable the construction of the high cost irrigation works, of which Alessandro District affords the present best example.

We have not been indebted to either irrigators, farmers, or horticulturists from abroad, or from other States, nor yet to those who had become such under the old time methods and primitive works in California, for the development of that higher order of irrigation water service and culture methods which I have herein described. A class of intelligent, thrifty, and industrious business men came here, and became irrigators, not only because of business enterprise, but on account of the pleasant and healthful surroundings and conditions which they found in a number of possible irrigation neighborhoods.

These people, finding that they could live as they would want to live, in moderate luxury even, in these neighborhoods, and in good health and comfort, also found dormant energies and undeveloped wealth. Being possessed of the business qualities and the means, they have made far greater horticul-

tural successes, and correspondingly greater revenue, from lands than any set of mere irrigators or farmers ever would have achieved here. They were not tied up by prejudice, former practice, and a little knowledge of the subject. They knew nothing that hampered them in learning to make the most out of the country. They had the means to try. They tried, and again tried, and succeeded. They are a class of people who can afford to pay more for lands than a people who have had less advantage of education and business training, and have been raised in communities of less thrift; because they not only cultivate and manage better on the lands themselves, but enter the markets of the world equipped as business men, and make reputations and get high prices for their products.

While, of course, by far the greater number of such people coming here have simply settled down to business and horticultural pursuits, representative spirits have taken development enterprises in hand.

The expenditure of thirty to thirty-five dollars per acre, and even more, on lands worth one to twenty dollars, dry, in works to make them yield large margins of profit over interest on several hundred dollars per acre, and in rendering possible a business at once pleasant and healthful, as well as profitable, for cultivated people, has been to such men not only a solid business proposition, but an operation for enthusiasm. This constitutes the business of high-class irrigation development. Irrigation, principally, of fruits and the vine, is its supplement.

The Alessandro District is an enterprise purely of this class. It was started with the ownership of 21,000 acres, of the total 25,500, in the hands of a speculative company; and the remaining 4,500 acres were owned by less than a dozen individuals, who themselves wanted to serve water to it for purposes of speculation. In my judgment, these circumstances afford the strongest possible assurance of the district success. No mere community of small land owners can compete in the initiation of primary development enterprise, with a well managed speculative company.

In the first place, land on which a large population could

have existed without irrigation is not suitable to that class of enterprise which will enhance values sufficiently to justify construction of the works here necessary. A small population of men of no special business experience cannot manage such an enterprise to as good advantage, commercially, as a powerfully organized speculative company. The Alessandro, the Perris, and some other irrigation districts now developing in Southern California, are made possible by the existence of great water-supply companies, which can, with profit to themselves, furnish water to the districts at costs which their lands will ultimately bear. But population there must be promptly, when a large district is opened up for irrigation, else lands lie dormant, and the interest account may not be met. To secure this population, extensive advertising and keen business management are essential. These are only assured where there are such powerful organization and incentives as speculative enterprise of this character affords.

In the next place, no such complete and perfect works of distribution as those going into Alessandro District ever would have been attempted, but for the unification of the speculative advantage to be gained by them. These works are put in to sell the lands at high figures, and they will do it,—are doing it. There was no division of opinion on the question of building them, no community to be consulted, no vote to be had. The speculative company builds them, and gives them to the district. The purchasers of land—the settlers—pay for them in advanced land prices. The better works enhance actual values much more than the cost difference over ordinary construction. And, moreover, system and economy of construction keep cost much below that probable under community management. The other large land owners take the cue. The improvement becomes complete in the district. A specially desirable and thrifty class of settlers is thus drawn in; and district success is assured.

Finally, the speculative company has an interest in the success of the district beyond the mere selling of its lands. It remains a water-supply company to the district, and the rates it is to receive under its contracts with the district itself and with the persons to whom it sells lands are such as to leave this a

profitable business. Hence, its interests will prompt that continued effort which a great corporation can put forth in the interest of a neighborhood, but which a new and weak community can not, to advantage, exercise for itself. The objection to water monopoly raised in connection with irrigation development in this country is not honestly applicable in cases of this particular kind. In my judgment, such developments could not, for reasons in part only given above, be economically and successfully realized without it. As to the subsequent burden of water-rentals or annual payments: although such as will be remunerative to a company, they are not found burdensome on these communities. The advantages gained more than offset them.

The fact, therefore, that speculative enterprise has been at the bottom of Alessandro District formation and promotion not only accounts, in great measure, for the high character of its works, but, to my mind, is a point in favor of its probable success as a community or settlement.

This class of works would not be possible, commercially, in any of the old irrigation countries of Europe, Asia or Africa, and I doubt whether as great expense and minute thoroughness are justified by conditions in our own country, outside of California.

Consider for a moment the supplying, delivery and distribution of water to these Alessandro lands. It is brought in a steel pipe under high pressure, from a watershed not tributary to the valley, a distance of ten miles; then it is put through a concrete-lined tunnel about half a mile in length, piercing a dividing mountain ridge; then in concrete-lined ditches, steel pipes, and "iron-stone" cement-laid pipes, two to fourteen miles additional, to the commanding corner of each twenty-acre tract on which it is to be used. Practically, none of it is lost. It is brought from its mountain home, pure, sweet, and quite cool. It is delivered fit for domestic use. It will be so used up to the limit of demand. And even in its distribution within the little fields and orchards, it is conducted in pipes, or cement or brick ditches or flumes, to within a few feet of

the especial square yard of ground into which it is permitted to soak in irrigation.

There are as yet no works of as high an economic grade projected elsewhere, to serve large areas of land, as are those of the California series into which this Alessandro District system enters.

The company which has contracted to deliver water to the district constructs the supply arteries of the system. The district is one of its customers. The district works are simple, easy of construction, cheap of maintenance, and will be economical of operation and administration, and lasting in character. They consist of hard-burned "iron-stone," or vitrified clay pipes, laid with cement joints, outlets of similar materials with iron shutters, measuring boxes of concrete or vitrified clay, with iron weirs, and the standard (town supply) water pressure-gates at outlets from main pipes.

CONDITION OF THE WORK.

For the reason that the district is not constructing any works, it is not possible to present a CONSTRUCTION PROGRESS STATEMENT such as has been made a part of reports heretofore submitted by the writer, on other districts.

The Bear Valley Company's work is being pushed forward with every apparent effort at such haste as thoroughness will admit of. It has expended over \$400,000 in supply and delivery works, intended for its customers in this valley. It has expended over \$180,000 on works within the limits of Alessandro District, and of this amount more than \$80,000 has gone into distribution works which will become the property of the district. Over 4000 acres of land may now be served as finally intended, and the work is progressing as fast as materials can be delivered by their sub-contractors.

PROBABLE IRRIGATION EFFECT.

To one who has read the foregoing pages, it may seem altogether superfluous to say anything further as to the probable effect of irrigation in the Alessandro District. The reports, of

which this is a single one only, are attempted to be made under a system such that they may be compared as between themselves, and used for reference singly. It is an aim to have matter of each certain class under its heading, even though, incidentally, it has found place in other articles, so that repetition is made necessary where the caption would lead one to find it. Hence, at the risk of the charge of prolixity, I again review here the horticultural outlook for Alessandro District, as consequent upon irrigation.

Practically, there had been before the district work commenced less than 1000 acres in cultivation of the lands now in the district. A little grain was raised. A struggling orchard and vineyard or two were found. The remaining lands afforded a scanty pasture to sheep and cattle for part of each year.

Irrigation is changing this completely. The orange and lemon, the olive and fig, and the vine are occupying the higher and more sloping lands. Deciduous fruits of many kinds, and especially the pear, with alfalfa and field vegetables on small areas, will be grown on the lower and flatter lands of comparatively heavy soil.

The agricultural change is now progressing. It will be as complete and radical as any such change could be. The Alessandro District lands, lately a waste, almost, are becoming orchard lands, vine lands, and green pastures. Alfalfa for hay, and field vegetables will be grown for home consumption. Citrus and deciduous fruits, olives and the produce of the vine, will find a market by rail, chiefly far from this state.

LITIGATION AND LOCAL SENTIMENT.

There has been no litigation about Alessandro District affairs. There has been no difference of opinion as to any question of vital importance touching the district, either among those who live in it, or those who are interested in its lands. The sentiment of voters and land-owners, alike, is all in favor of irrigation by the means adopted, and on the basis of the bonded indebtedness it makes necessary. The life of this country depends on irrigation. With it, riches come. Without it, poverty. Alessandro is in favor of irrigation, and is able and will be able to pay for it as payment becomes due.

CONCLUSION.

The Irrigation District reports, of which this is but a single one, are being made with the view, so far as the writer can give them character, of stating and explaining the physical and engineering problems, describing the works, and estimating the cost of irrigation to the several districts, with the object of exposing the business status and prospects of each one. The information is, as I understand, desired in this form for those who may contemplate having relations with any such district, or may desire to invest in or handle its bonds.

There are five general questions which may affect the value of such securities :

- I. Has the district issuing them been given due authorization and power so to do? Is the law under which it is formed, constitutional? Is the organization one which can be granted such power? Has it been granted the power?
- II. In the case of the district whose securities are under consideration, have all the proceedings taken under this law, up to and including the issue and sale of the special bonds in question, been in accordance with the provisions of the law itself?
- III. Is the realty security offered under the law, commensurate in value with the debt proposed to be put upon the district to carry out its irrigation enterprise?
- IV. Is the enterprise itself, in which it is proposed to use the money raised on the district bonds, a good one, from engineering and irrigation standpoints? Can it be made to succeed within the limit of cost contemplated, or within a limit commensurate with benefits which the people of the district may expect to receive?
- V. Are other conditions with respect to this district, and its enterprise, such as to render business prospects therein good? Will its people probably be prosperous under the burden of debt they take on themselves for this purpose;

and hence, probably be inclined to pay the interest and principal of this bonded debt, without making trouble for their creditors ?

It is understood, of course, that the constitutional and legal points raised by the first interrogatory, and those of law and procedure raised by the second, are foreign to the aspect of the subject to be viewed in this report.

The writer hereof undertakes, for the case in hand, to definitely answer the third and fourth questions, and also to throw some light upon, and express an opinion on, the points raised by the fifth.

In my opinion, based on facts and reasons stated in and apparent from the foregoing review of this enterprise,—

The marketable value of the lands of this district is now much in excess of the bonded debt placed upon it for the purchase of water rights and delivery of water to it.

This is a specially favorable area for irrigation enterprise of the character here projected, and one suitable to be embraced in an irrigation district.

Irrigation industry should succeed in this district. The lands with the water rights should be at least doubled in value, as the effect of it in a very few years ; and within another few years, as population presents itself and demand grows for the product, these values should enhance as much more in addition.

The values here referred to are those based on ability to produce and support populations ; and not values based on the desire of independent people to possess beautiful grounds, or to engage in fancy farming.

The property proposed to be pledged under the law is ample, and with a large margin in this case, as security for a bonded debt of \$765,000, or \$30 per acre on the district ; which is all there is any necessity, under existing circumstances, for placing on it for its irrigation enterprise.

The district itself has no engineering scheme. The water-supply contracting company constructs its own works and gives the use of them to the district for its service, in return for its bonds. The land owners construct distribution works of high class, and present them to the district.

The water supply for the district is contracted to be delivered by a great water-supplying company, having a large plant, commanding extensive water rights and privileges, possessing a large capital, and rapidly extending its scope and apparent strength.

The conditions generally now present, and those likely from ample precedent to prevail, are of character specially favorable to that social and business result in the Alessandro District which should tend to make it a good [REDACTED] debtor.

Any discussion of the principles of Irrigation District laws, or the merits of that which California has enacted, and under which this Alessandro District (and about thirty others) has been formed, would, of course, be out of place here. That is the political side of the question, with which the writer in his present capacity, can have nothing to do.

Very respectfully yours,

WM. HAM. HALL.

SAN FRANCISCO, CAL., Oct. 1st, 1891.

Exhibit I.

ALESSANDRO IRRIGATION DISTRICT.

Works Construction, to Date, Within the District. By the
B. V. I. Co.

STATEMENT OF EXPENDITURES.

Sept. 15, 1891.

	Excavation and Refilling.	Materials of all Kinds.	Labor.	Totals.
<i>Main Canal</i> —On Redlands Boulevard—South end of Tunnel to Distrib. Res'r..	\$1,634 79	\$1,543 40	\$865 55	\$4,043 74
<i>Distributing Reservoir</i>	1,290 00	267 25	90 00	1,647 25
<i>Main Flume</i> —On Redlands Boulevard — Distributing Res'r to Hemlock Ave....	167 99	1,711 85	643 46	2,523 30
<i>Main Flume</i> —On Ironwood Avenue—From Redlands Boulevard, East.	335 68	2,269 48	321 46	2,926 62
<i>Main Steel Pipe</i> —On Cot- tonwood Ave.—Redlands Boulevard to Lasalle St. .	1,724 38	16,406 00	112 20	18,242 58
<i>Main Vitrified Pipe</i> — On Grevillea Ave.—Redlands Boulevard to Judson St ..	5,638 52	34,222 58	1,132 91	40,994 01
<i>Main Steel Pipe</i> —On diag- onal line—Judson St. to Frederick St.	1,627 68	16,700 42	31 00	18,359 10
<i>Br. Main Vitrified Pipe</i> —On Quincy St.—Main Canal to A.O.G. & F. Co. Tract	700 67	4,670 50	343 61	5,714 78
<i>Lateral Pipes</i> — Distributar- ies—On Streets from The- odore to Heacock.	20,985 24	53,942 01	5,099 05	80,026 30
<i>Moreno Town Service Pipes.</i>	490 64	5,704 60	5 00	6,200 24
Totals	\$34,592 59	\$137,438 09	\$8,644 24	\$180,677 92

JAMES T. TAYLOR,
Engineer in Charge.

ALESSANDRO IRRIGATION DISTRICT.

An Illustration of the Probable Tax Levy Rates necessary to pay the Principal and Interest of a \$765,000 Bonded Indebtedness.

Year of Assessment.	Assessed Valuation of Property in District.	Balance of Principal Due.	Principal.		Interest. 6 per cent. on Balances, to be Paid.	Sums of Annual Payments.	Tax Levy Rates.		
			Per cent. of Whole.	Amount to Be Paid.			To Pay Principal.	To Pay Interest.	For Principal and Interest.
11th	\$4,500,000	\$765,000	5	\$38,250	\$45,900	\$84,150	.85	1.02	1.87
12th	4,700,000	726,750	6	45,900	43,605	89,505	.97	.92 7-10	1.90 3-10
13th	4,900,000	680,850	7	53,550	40,851	94,401	1.09	.83 3-10	1.92 6-10
14th	5,100,000	627,300	8	61,200	37,638	98,838	1.20	.73 8-10	1.93 8-10
15th	5,300,000	566,100	9	68,850	33,966	102,816	1.29	.64 9-10	1.93 9-10
16th	5,500,000	497,250	10	76,500	29,835	106,335	1.38	.54 3-10	1.93 2-10
17th	5,700,000	420,750	11	84,150	25,245	109,395	1.47	.44 3-10	1.91 9-10
18th	5,900,000	336,600	13	99,450	20,196	119,646	1.68	.34 2-10	2.02 7-10
19th	6,100,000	237,150	15	114,750	14,228	128,978	1.88	.18 1-10	2.11 4-10
20th	6,300,000	122,400	16	122,400	7,344	129,744	1.94	.3-10	2.05 9-10
				\$765,000			Dollars on \$100 of Valuation.		

NOTE.—See Report, under heading "Future Financial Outlook."

Exhibit III.

ALESSANDRO IRRIGATION DISTRICT.

FINANCIAL STATEMENT.

Sept. 1st, 1891.

General Fund.

	1890-91
Receipts (no taxes yet collected)	\$645 00
Disbursements	443 85
Balance	\$201 15

Bond Fund.

	1890-91
Receipts (no taxes yet collected)	None
Disbursements (no interest yet due).....	None
Balance	None

Construction Fund.

	1890-91
Receipts—Sale of bonds at par	\$765,000
Disbursements—Paid for water-rights and delivery..	765,000
Balance	None

Summarization.

	General Fund.	Bond Fund.	Construction Fund.	Total.
Receipts.....	\$645 00	\$765,000	\$765,645 00
Disbursements..	443 85	765,000	765,443 85
Balances ...	\$201 15			\$201 15

[Signed]

B. W. BROWN, Treasurer.

Exhibit IV.

ALESSANDRO IRRIGATION DISTRICT.

ASSESSMENT AND TAX STATEMENT.

ASSESSED VALUES OF.	AREAS COVERED.	VALUATION, 1890-'91.
Farming lands		\$2,396,819 00
Improvements thereon		1,520 00
Town property		18,542 00
Improvements thereon		200 00
Railway right-of-way track and depot grounds		18,955 31
Total in district		\$2,436,036 31

ASSESSED VALUES OF FARMING LANDS.

Average of district per acre	\$ 95 87
Highest for 40 acres	100 00
Lowest for 40 acres	33 50
Highest for 320 acres	100 00
Lowest for 320 acres	37 45

ASSESSMENTS.

Rates of levy for district purposes (per \$100 of valuation)	\$ 2 25
Total amount levied	54,384 32
Total amount collected (collections not commenced)	Nothing

TAX RATES.

State and county (per \$100 of valuation)	\$1 60
District	2 25
Total	\$3 85

RAILWAY ASSESSED.

Mileage	3 55
Rate per mile	\$ 5,054 75
Total valuation	18,955 31

[Signed]

JOHN T. LEONARD, Assessor.

Exhibit V.**ALESSANDRO IRRIGATION DISTRICT.**

BOND ISSUE AND INTEREST STATEMENT.

OFFICE OF THE BOARD OF DIRECTORS,
ALESSANDRO IRRIGATION DISTRICT.

MORENO, CAL., Sept. 1, 1891.

This is to certify, that the Board of Directors of the Alessandro District have, up to date, disposed of bonds of the district to the total par value of seven hundred and sixty-five thousand (\$765,000) dollars. These were all paid to the Bear Valley Irrigation Company, at par, for 51,000 Class B 1-acre Water-right Certificates, under the terms of the contract with that company, dated May 6th, 1891.

[Signed]

GEO. H. KELSEY, Secretary.

Appendix A.

NOTES.

NOTE 1.—Lands may be of good soil, and upon a plain whose general form and slopes are suitable to irrigation, yet still be so rough in details of surface as to cause comparatively much expense in preparation for irrigation. Again, the soils and general appearance of a plain may seem favorable to irrigation, and yet, larger irregularities of form in the ground surface—long ridges and “coulees,” swells and “draws”—dividing the plain into eccentric subdistricts, and making excessive ground slopes, locally—may be so pronounced and prevalent as to necessitate much extra expense in carrying out an efficient distribution system, economical of maintenance and in operation. The Alessandro District lands are, in large part, quite free from these drawbacks. They are, as a whole, favorable to economical distribution and low costs of preparation for irrigation.

Again, to be economically handled under irrigation, a soil must be mellow, friable, receptive, and retentive of moisture, and must not “bake,” or form a hard crust after irrigation. Most soils thus favorable are not specially rich—are light and sandy. The Alessandro District slopes are rich, and, for the most part, not light, but seem still to possess the above qualities favorable to working under irrigation.

NOTE 2.—Some rainfall records and estimates of precipitation in this southern country are withheld from publication with this report, to be embodied with an opinion on the water-supply of the region generally, and now in course of preparation.

NOTE 3.—Data and statistics of crops and prices—the practical money-making results of irrigation in this region—are purposely omitted from this report. They only go to establish values, and the writer feels that the statements herein on this point are quite sufficiently conservative, and justified by broad and well-known precedents, to be accepted without this burdensome species of demonstration.

NOTE 4.—From a business standpoint, the necessity for irrigation in any region depends on what it is desired to accomplish therein. A region may well support 10 people per square mile without artificial watering, but to support 100 people, irrigation would become an absolute necessity. And these figures may be much varied. Some dry regions, well cultivated, as in wheat-growing sections of this State, support not over 5 people per square mile. Some irrigated regions, as quarters of the valley of the Po in Italy, support 350 people per square mile.

The necessity for irrigation for the support of such dense, or even what we may call “full” populations—from 100 to 120 people, directly dependent on agriculture, to the square mile—is not governed alone by the quantity of rainfall a country receives, nor is it to be determined exclusively by the fact of unproductiveness. A country may have ample rainfall and yet need irrigation to support such population, as much as one having practically none at all. Conditions of soils and subsoils, of rainfall distribution, humidity and others of meteorological character, may be such as to turn the scale. There are lands in Northern California tillable and rich in soil ingredients, which will not support five people per square mile under a rainfall of twenty-four inches. There are others in Southern California, and not “moist” lands either, which support twenty people per square mile under a rainfall of twelve inches, and without irrigation.

NOTE 5.—There is no country where practical agricultural worthlessness and wealth (interpret the words as strongly as we may) lie more closely together than in Southern California. The presence of worthlessness is apparently essential to the existence of local wealth. If all this country were irrigated, and so not worthless, there would be little wealth produced by any of it. The atmosphere of an immense spread of surrounding dry country is essential to the peculiar wealth-producing ability of the artificially moistened oases.

There is no country where success, agriculturally, or rather horticulturally, is or may be so apparently signal; none, on the other hand, where failure often is so dismal and complete. Possibilities are to be judged of here, not by the casual farmer's glance, but by broader views, which reach, perhaps, to some distant mountain range, and consider hydraulic problems much above the common.

NOTE 6.—The steady advancement now found in Southern California is due to horticultural growth. The town lot, speculative craze of 1885-88 is over with.

NOTE 7.—The "miner's inch" is a measure or unit of water flow now much used in connection with irrigation in California, and is about the equivalent of one-fiftieth of a cubic foot per second.

NOTE 8.—"Water duty" refers to the extent of service which any unit volume of supply will perform in irrigation. The cubic foot per second, or "second-foot," is the unit volume ordinarily referred to in speaking of duty under large irrigation projects having open canals of supply. The "miner's inch" is more often used in Southern California, where works are of a higher class, and volumes handled are much less.

According to the character of cultivation, of soil and sub-soil, method of irrigation and kind of works of delivery and distribution, the duty of water varies in California, even under good management, between 50 acres to the second-foot, or 1 acre to the miner's inch, and 10 acres to the inch, or 500 acres per foot per second.

NOTE 9.—The value of this class of irrigation depends on the service of just as much water as, and no more than, the soil will take without starting lateral percolation or saturating it down to ground water. When these effects are produced this irrigation is excessive and will defeat its object—the production of sweet fruit. Young trees thus habitually over-irrigated always demand such excess thereafter, when grown.

NOTE 10.—The writer does not assume the role of consulting or advisory engineer, in this reporting duty. No criticism will be made on works or projects unless so bad as to affect the value of district securities.

NOTE 11.—Irrigation waters have cost, delivered (not distributed) in Southern California, in good works, from \$50 to \$400 per miner's inch of continuous flow, and have been sold at materially higher rates.

NOTE 12.—Values of lands of the classes here under consideration, although based on ability to yield revenue, yet depend, while a country is developing and being brought under cultivation, upon demand. It takes capital to bring an orange or olive grove into bearing. Those who have enough means and desire to take up these industries are not always equal in numbers to the supply of lands served with water and offered. Consequently, there are times of depression in irrigation development enterprise.

NOTE 13.—And after development of the irrigation industry, there must be, as in all business, periods of comparatively low demand for its products. It is not believed by the writer, though, that there is any danger of over-production of the principal fruits of irri-

gation in Southern California. There may be temporary gluts of markets, and losses accordingly, but better transportation facilities and more thorough handling in distribution, it is believed, will profitably place Southern California fruits for many long years to come.

NOTE 14.—Commercial values of lands in Alessandro District might well be placed 30 per cent higher than the \$150, \$300 and \$450 per acre, assumed as the sub-basis for figures at succeeding periods in the bond redemption illustration submitted.

NOTE 15.—The value of lands "as mortgage securities" depends on, and is generally less than, their commercial value. Saving banks in California lend on lands from 30 to 60 per cent, according to circumstances of their secure values, or the amounts for which they could be sold at forced sale.

NOTE 16.—Comparing, for instance, Alessandro District works with those of Central District,—the former will deliver and distribute in pipes to every 10-acre tract,—the latter in open ditches to every 640 or 320 acres only. Hence, a potent reason for the wide difference in cost of distribution.

Appendix B.**WATER RIGHT AND DELIVERY CONTRACT.**

THIS AGREEMENT, made and entered into the 6th day of May, A. D. 1891, by and between the Bear Valley Irrigation Company, a corporation, having its principal place of business at Redlands, in the County of San Bernardino, State of California, the party of the first part, and the Alessandro Irrigation District, a public corporation, in said County of San Bernardino, State of California, the party of the second part,

WITNESSETH : That the said party of the first part, for and in consideration of the undertakings of the said party of the second part, hereinafter entered into, has agreed and does agree to and with said party of the second part to sell and transfer to said party of the second part, and does hereby sell to said party of the second part, fifty-one thousand (51,000) Class "B" Acre Water Right Certificates, issued by said party of the first part, and the said party of the first part further agrees to deliver the water represented by said fifty-one thousand Class "B" acre water right certificates at any point below the south end of the tunnel constructed by the said party of the first part in the southeast quarter (S. E. $\frac{1}{4}$) of Section Twenty-six (26), Township Two (2) South, Range Three (3) West, San Bernardino base and meridian, along the line of the said Bear Valley Irrigation Company's canal and pipe line, running southeasterly from the south end of said tunnel to Redlands Boulevard, within said Alessandro Irrigation District ; thence south along Redlands Boulevard to the southeast corner of Block Thirty (30) of Map No. 1 of the Bear Valley and Alessandro Development Company, of record in the office of the Recorder of said County of San Bernardino, State of California ; thence westerly along or near Grevillea Avenue to a point at or near the southwest corner of Block Twenty-five (25) according to said map ; thence in a north-westerly direction to a point near the northwest corner of Block Eighteen (18) in said Alessandro Irrigation District ; thence in a southwesterly direction to the southwest corner of Block Two Hundred and Nineteen (219) according to said map ; thence by a line to be hereafter located, to a point at or near the southeast corner of Block Three Hundred and Fifteen (315) according to said map, or along any other main line to be hereafter constructed by said Bear Valley Irrigation Company, provided that the said party of the first part, in delivering water along any main pipe lines referred to herein, shall be obliged to provide no greater capacity than is sufficient for the water represented by two of the aforesaid certificates per acre for the lands lying below said main.

And the said party of the second part hereby agrees to and with the said party of the first part to purchase from the said party of the first part the fifty-one thousand (51,000) Class "B" acre water right certificates issued by the said party of the first part, and also agrees, in payment therefor, to transfer and deliver absolutely to said party of the first part the bonds of the said Alessandro Irrigation District, caused to be issued by the Board of Directors of said district, pursuant

to a vote of the qualified electors of the said district at a special election duly held therein on the 17th day of March, A. D. 1891, to the amount of seven hundred and sixty-five thousand dollars (\$765,000) at their par value, all of said bonds to be of issue No. 1, and to bear date of May 6th, A. D. 1891, payable in ten series, and bearing interest at the rate of 6 per cent per annum, payable semi-annually on the first days of January and July of each year.

And it is further expressly agreed and understood by and between the parties hereto, and as a part of this agreement, that the use of water represented by four thousand (4,000) of the aforesaid acre water right certificates shall commence on the first day of June, A. D. 1891 ;

That the use of water represented by six thousand (6,000) of said acre water right certificates shall commence on the first day of April, A. D. 1892 ;

That the use of water represented by six thousand (6,000) of said acre water right certificates shall commence on the first day of April, A. D. 1893 ;

That the use of water represented by six thousand (6,000) of said acre water right certificates shall commence on the first day of April, A. D. 1894 ;

That the use of water represented by six thousand (6,000) of said acre water right certificates shall commence on the first day of April, A. D. 1895 ;

That the use of water represented by six thousand (6,000) of said acre water right certificates shall commence on the first day of April, A. D. 1896 ;

That the use of water represented by six thousand (6,000) of said acre water right certificates shall commence on the first day of April, A. D. 1897 ;

That the use of water represented by six thousand (6,000) of said acre water right certificates shall commence on the first day of April, A. D. 1898 ;

That the use of water represented by five thousand (5,000) of said acre water right certificates shall commence on the first day of April, A. D. 1899 ; and that the water represented by each of the aforesaid fifty-one thousand (51,000) acre water right certificates shall be ready for use thereon on the day on which such use thereof, as stipulated above, is to commence, and continuously thereafter.

And that the first semi-annual payment of One Dollar and Thirty-nine Cents (\$1.39) to become due and payable on each of said certificates shall commence on the first day of the month of October, of the year in which the use of water on such certificates is to commence, as stipulated above, and that the further semi-annual payments of One Dollar and Thirty-nine Cents (\$1.39) on such certificates shall be made on the first days of April and October of each year thereafter.

And it is further agreed by and between the parties hereto, and as a part of this agreement, that the Board of Directors of the said Alessandro Irrigation District shall have the right, on the first day of April, A. D., 1893, and on the first day of April in each year thereafter, to have an increase in the number of the aforesaid Acre Water Right Certificates on which the use of water shall commence in such year, in accordance with the foregoing stipulations, until the use of water shall have commenced on all of the aforesaid certificates ; provided that the said Board of Directors shall notify the said Bear Valley Irrigation Company of such desired increase at least six months prior to the time when such increase is desired.

IN WITNESS WHEREOF, the said parties hereto have caused this contract to be executed by their respective Presidents and Secretaries, and the seals of said parties to be hereto affixed, the day and year first above written.

Exhibit "I."

Total Issue, 100,000.

No.

..... Cts.

CLASS B. BEAR VALLEY IRRIGATION COMPANY.**ACRE-WATER-RIGHT CERTIFICATE.**

IN CONSIDERATION OF.....DOLLARS, in hand paid, and the payment on each certificate issued of \$1.39 on the first day of April, and \$1.39 on the first day of October, of each year, the BEAR VALLEY IRRIGATION COMPANY, a corporation, organized under the laws of the State of California, and having its principal place of business at Redlands, San Bernardino County, Cal., hereby issues to.....Class B, Bear Valley Irrigation Company Acre Water Right Certificates. Each Certificate is issued subject to the contract between the Bear Valley Land and Water Company with the North and South Fork Ditch Companies, Class A Certificates of the Bear Valley Land and Water Company, contract between the Bear Valley Land and Water Company with the Redlands-Lugonia and Crafton Domestic Water Company for 200 1-7 inches of water, contract between the Bear Valley Land and Water Company with the Crafton Water Company for 57 1-7 inches of water. Each certificate is hereby guaranteed by this company to entitle the owner thereof to receive one acre foot of water per year (an acre foot being 43,560 cubic feet of water) to be supplied from....., and from no other source whatever.

The owner of this certificate may elect to cumulate the use of the water which each certificate entitles him to receive in any manner he desires, provided, however, that this Company shall not be compelled to furnish more than 1-8 of an inch of water to each certificate, at any one time (an inch of water is equal to a flow of 1-50 of a cubic foot of water per second). The water called for by these certificates shall not become appurtenant to the land upon which the same may be used, but these certificates shall always be personal property, and a transfer hereof shall only be made by surrender of this certificate to the Company, properly endorsed, and the issuance by this Company to the transferee of a new certificate. It is agreed between the holder of this certificate and this Company that, on each certificate, there shall be paid \$1.39 on the first day of April, and \$1.39 on the first day of October, of each year, and that said sums shall be due and payable to the Secretary of the Company, at the office of the Company, at Redlands, Cal., without notice, and if not paid within 60 days after the same becomes due, this certificate shall become null and void, at the election of this Company, and all payments shall be forfeited to the Company as liquidated damages for the non-payment of such sums. Such forfeiture shall become effectual upon the passage of a resolution of the Board of Directors declaring such forfeiture. It is agreed that time is of the essence of this agreement, and that by the receipt of this certificate, the holder thereof assents to and agrees to all of the above stipulations.

..... Secretary.

..... President.

Appendix C.

CLOSING LETTER.

OTHER IRRIGATION DISTRICT ENTERPRISES.

WM. HAM. HALL,
CONSULTING CIVIL ENGINEER,
SAN FRANCISCO,
CALIFORNIA.
ADDRESS: 79 FLOOD BUILDING.

STATE IRRIGATION ENGINEER OF CALIFORNIA; 1878-1888.
SUPERVISING IRRIGATION ENGINEER
U. S. GEOLOGICAL SURVEY; 1889-1890.

SAN FRANCISCO, Oct. 5th, 1891.

J. W. NANCE, ESQ.,

President State Association Irrigation Districts,

DEAR SIR :

In transmitting the foregoing report on the Alessandro Irrigation District, it will not be amiss for me to guard against possible misapplication of some of its paragraphs; and, hence, this closing letter on the subject of irrigation district enterprises in general.

Under the request you have made to the directors of the various districts, to have their projects examined and reported upon for information in financial circles, as suggested to you and others by certain leading men in San Francisco banking circles, it is but natural that the district officers having most confidence in their enterprises, and with plans of works already well developed, should be first to request that such projects be reported upon.

The Alessandro District is a case in point. It has been the third to make application for my services, and is the third reported upon, and I have found its engineering affairs in good condition.

It has now transpired that apparently three of the very best districts in the State have been first to present themselves. The inference plainly is, that what might be reported of some other districts, should I be called on to examine them, is not to be forejudged by what I have written in the reports thus far made.

As I have tried to be plain and thorough in treating of districts whose enterprises deserve approval and even praise, in my judgment, so shall I not hesitate to be equally explicit and decided in condemnation, should any district project come before me for review which I believe to be unsound.

It is to be remembered, however, that district officers having charge of good enterprises may not present them for examination at all.

Moreover, because I may now have written of the Central, the Perris, or the Alessandro District, that it has a good project, specially because of some certain favorable circumstances or features, it does not necessarily follow that district enterprises which have not all such advantages are not good.

The question of water-supply, particularly, is one which has to be considered with absolute independence for each case. Enough water per acre with works of a certain class, cultivations of certain kinds, and soils of such and such grades, might not be enough were these conditions altered.

But water-supply problems sometimes admit of solution in ways not at first apparent. Storage of flood waste waters, or even development of underground flowings, may put a district project in first-rate form, where nothing but conflict with prior appropriators and other interests seemed at first imminent. At the same time, these are problems to be studied, and not answers to be jumped at. There is going to be failure in instances of this sort of thing, and consequent disaster, at some places in this State.

As to conflicts over water rights, of which so much is said and threatened : unquestionably, a number of district enterprises will have to incur these. But the law anticipates this, and provides for it. The question in each case will be as to the measure of conflict ; its possible influence ; its probable cost ; the ways of avoidance ; the outlook for compromise ; its probable effect on district prosperity, and, consequently, on district credit.

I have now reported two districts out of three as having, so far as I can ascertain, a unanimous feeling among their taxpayers in favor of the district irrigation work. But it does not follow that a district having a less harmonious and favorably disposed property ownership has not a good enterprise.

Experience with these developments has shown me that there is a class of people who resist every advance step it public enterprise, especially when it comes in a form not altogether familiar to them ; and more especially when it is under guidance of their nearest neighborhoods.

There are irrigation enterprises in this State whose full realization would, under proper guidance and in a thorough way, be cheap at a cost over \$50 per acre of lands served under them. There are others which would be disastrously dear at \$5 per acre for water, works and distribution. It cannot be judged, therefore, from the costs reported as reasonable for the districts thus far examined, what might be within bounds for other schemes.

Several districts appear in these foregoing reports as making fairly complete and systematic business and engineering exhibits of their affairs. Other districts may not at once, and without preparation, be able to furnish data for such exhibits. That is no reason why they may not have their engineering plans and estimates, and official accounts, put into equally satisfactory form before calling for an examination, however.

There may be district schemes in the State which are not on their face, as now organized, as sound as those thus far reported on. But such may be susceptible of reorganization. There may be some other good project available for the lands of a district, or a large part of them. And, hence, the poorest appearing districts, even as now organized, and works as now projected, should not, on superficial knowledge, be finally judged by comparison with Central, Perris, or Alessandro Districts, as these have been reported.

In short, there are many points of this kind which might be mentioned. Each district presents its own problem ; and it cannot be judged from one report what another may or should be. I write this that I may not be misinterpreted, and that I may not, through mistaken inference, be thought to do injustice or harm in any quarter.

Respectfully yours,

WM. HAM. HALL,

Consulting Civil Engineer.

ATTORNEYS' OPINION.

SAMUEL M. WILSON.
RUSSELL J. WILSON.
MOUNTFORD S. WILSON. }

LAW OFFICES OF WILSON & WILSON,

202 SANSOME ST.

SAN FRANCISCO, CALIFORNIA,

November 9th, 1891.

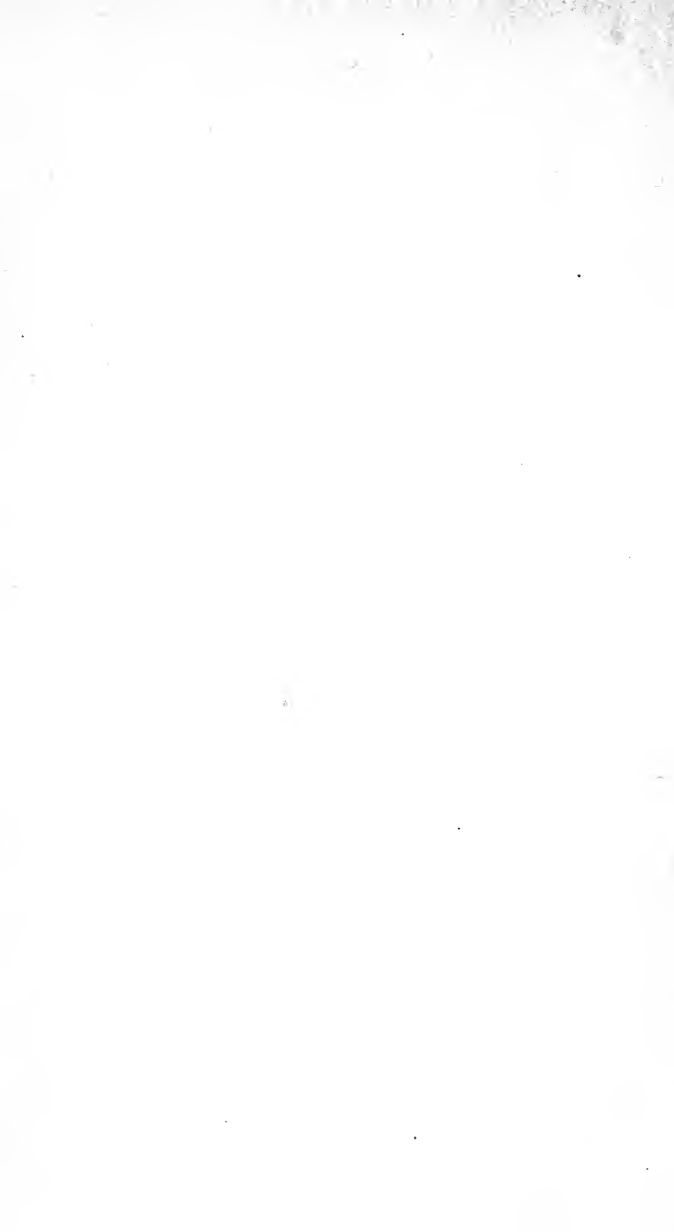
TO HON. J. W. NANCE,

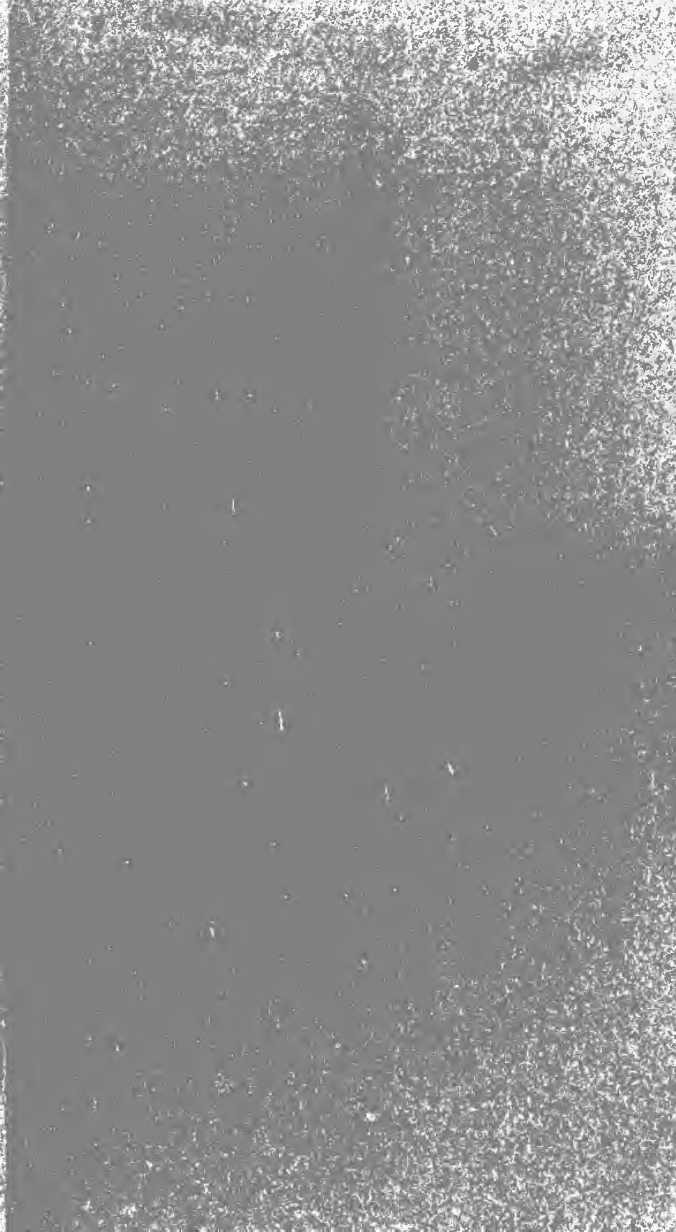
President State Association Irrigation Districts,

DEAR SIR. We have, at your request, carefully examined the proceedings of the Board of Directors of the Alessandro Irrigation District, taken by that Board in the Superior Court of the County of San Bernardino, under the "Confirmation Act," passed by the Legislature of the State of California on the 16th day of March, 1889, said examination having been made for the purpose of ascertaining whether or not those proceedings conform to the requirements of said Act; and beg leave to report that we are of the opinion that all of said proceedings are covered by, and are in conformity to, the requirements of said "Confirmation Act."

Respectfully yours,

WILSON & WILSON.





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 For information as to Bonds, address

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